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Inflation Methodologies in Securities Fraud Cases: Theory and Practice

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There are several basic methodologies for measuring the true value in a stock before a corrective disclosure of previously omitted or misstated information. Among the most common are the constant dollar inflation, constant percentage inflation, and constant true value methodologies. In this paper, we consider the theoretical justifications for each methodology given different types of allegations. We further examine the interaction of the choice of inflation methodology with the measurement of damages given the loss causation requirements of the securities laws. Finally, we examine settlements of shareholder class actions and document that an extremely large (and likely unreasonable) share of those settlements use the constant true value methodology.

I. Introduction

One of the key tasks in assessing damages in a securities fraud case is the determination of what portion of the traded stock price is real (the true value) versus the part that is due to alleged misstatements or omissions (the inflation). If liability is established, then the calculation of the inflation in the stock price serves as the basis for all damage claims. As such, it might be expected that there is a large literature on how the inflation is to be measured. In fact, while there are some papers that do discuss how to measure inflation, there is not a large literature on which methodology is appropriate,[1] and we are unaware of any literature on the differing bases for deciding between a constant dollar and constant percentage inflation. At best, most papers discuss how to measure the effects of a corrective disclosure, generally at the end of a class period, and then assert how this information is to be used to calculate the inflation in the stock price at earlier points in time.

Section II of this paper attempts to provide a framework for thinking about which inflation measure may apply in different situations. Section III then discusses how these

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[1] One partial exception is Bradford Cornell and R. Gregory Morgan, "Using Finance Theory to Measure Damages in Fraud on the Market Cases," *UCLA Law R., 1990*, which discusses the differences between the constant percentage inflation and the index method/constant true value.

different inflation measures interact with the loss causation requirements of the securities laws. Section IV examines a year's worth of settlement plans of allocation to estimate the frequency with which different inflation measures are used in practice. Sections V and VI review the results and conclude.

II. Theoretical Bases for Different Inflation Measures

The implicit basis for most measurements of inflation is that a stock price represents a share of the sum of the current net assets plus the net present value (NPV) of a company's future free cash flows.[2] Consequently, if a company provides misleading information about its operations or plans, or fails to provide required information, the market will misvalue the company's cash flows and the resulting stock price will be incorrect. When there is a corrective disclosure, the market then reassesses the company's current net assets and/or future cash flows and sets a new stock price. For example, if a company's stock price falls from $10 to $9 after a corrective disclosure (after adjusting for concurrent market and/or industry effects and any non-disclosure company-related news), then the effect of the disclosure was $1 *at the time of the disclosure*. The question then becomes: what would the effect of that disclosure have been at an earlier time?

There are at least three commonly utilized answers to this question. One may assume that the disclosure at any time in the past would also have resulted in a stock price decline of $1. This is *the constant dollar inflation* method. Alternately, it can be assumed that an earlier disclosure would have also produced a 10% stock price drop, regardless of the initial price. This is the *constant percentage* method of calculating inflation. Finally, we may assume that an earlier disclosure would have resulted in a subsequent stock price of the stock's "true" value, or $9. This is the *constant true value* method of calculating inflation. As discussed below, each of these methods has profound implications for the assumed effect of the fraud on future cash flows and for the calculation of damages.

[2] The Present Value (PV) of a stream of future cash flows is the amount that must be invested today in a project of an equal risk level to produce those cash flows in the future. Barring arbitrage, therefore, it is the value today of those cash flows.

A. Theoretical Underpinnings

Basic corporate finance, in the form of the dividend discount model and its variants teaches that the value of a company's stock is the present value of the expected cash flows that will accrue to that stock. This result has implications for calculating damages due to a misrepresentation of a company's current and/or future business. In essence, the nature of the misrepresentation – its effect on expected future cash flows and hence the value of the firm – will determine the proper method to use when estimating share price inflation.

We begin by examining four basic types of disclosures about future earnings in order to determine the implications for the price of a company's stock price, and hence to draw some conclusions about the appropriate model of share price inflation. The first type (Type I) of disclosure is a one-off shortfall. A firm announces that future earnings will decline by a one-time amount (say an unexpected expense) of $100 next period.[3] The effect of such an announcement is to decrease the value of the company's equity by the present value of $100 now. Alternatively (Type II), the firm may have announced that earnings in every future period would be $100 less than originally anticipated. In such a case, the company's equity will decrease in value by the PV of $100 received in perpetuity.[4] Two more cases are of interest. In the first (Type III), a company may announce that instead of growing by 10 percent a year from a base of $100 in the next period, earnings will instead grow at 5 percent a year. It is apparent that the dollar difference in the two earnings streams will diverge over time; however, the divergence will be a simple function of the discount rate, and the difference in expected growth rates, and is captured by the present value formula adjusted for the differing growth rates. The effect on the company's equity is a decrease in value equal to the present value of $100 in perpetuity adjusted for the difference in the two assumed growth rates. Finally (Type IV), a company may announce that earnings in each period of the future will be a fraction - say 90 percent - of what was originally anticipated. In this case, the PV of expected future earnings after the disclosure – and by extension, the company's new stock price – are the same

[3] Unless stated otherwise, these figures are assumed to be after-tax values. These changes are also assumed to come from events that will impact cash flows and not from events with no true economic significance, such as a change in accounting policy.

[4] The value of $1 in perpetuity is $1/r, where r is the appropriate discount rate.

fraction of the PV of the originally expected cash flows.[5] The fall in the company stock price as a result of this disclosure will be the PV of $100 in perpetuity multiplied by one less 0.9. Interested readers can see Appendix 1 for mathematical representations of these inflation measurements.

The determination of the appropriate method to estimate share price inflation is aided by a simple observation derived from the theory of efficient markets: the change in the company's stock price should only reflect new information; as such, the choice between a proportional or absolute inflation measure is equivalent to the question of which measure only depends on new information.[6] Referring to our taxonomy of omitted or misstated information about earnings and to Appendix 1, the *difference* in the pre and post-disclosure prices can be expressed exclusively as a function of new information for Type I and Type II disclosures while for Type III and Type IV the *ratio* of the two prices reflects only new information. (The boxed calculations in Appendix 1 show the inflation measurement that does not depend on the original earnings level, X, but instead depends on the new information provided in the disclosure.) This shows that a constant dollar inflation measure is appropriate for Types I and II while a constant percentage inflation measure should be used for types III and IV.

There is intuitive support for this result. Type I and II disclosures are news about a fixed or constant change in future cash flows. As such, their immediate effect – the difference in price before and after the disclosure - can be expressed exclusively as a function of those (newly revealed) fixed amounts. Type III and Type IV disclosures are news about relative changes in future cash flows. Thus their immediate effect – the difference in price before and after the disclosure – must reflect both the old and new information.[7] The proportion of pre and post-disclosure prices, however, will fully reflect this information.

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[5] We thank Dmitry Krivin for pointing out that this is only true if the company has no debt. In fact, there is a constant percentage change in the total enterprise value of the company, meaning its debt plus equity. However, because of greater sensitivity of equity to changes in cash flows, the effect on equity is not a constant fraction. Interested readers can see an example of this phenomenon in Appendix 2.

[6] Speaking strictly, we want the inflation measure to reflect the PV of new information. Therefore it will also be a function of the discount rate. If we assume that present value equals future value, a discount rate of 1, then the appropriate inflation measure will – strictly speaking – contain only new information.

[7] This is because a proportion is meaningless in absolute terms without a standard of reference.

The constant true value inflation measure is not appropriate for any of the cases above. As discussed in more detail below, the principal assumption of the method, that no news other than the curative disclosure affects the stock price, is so extreme that it seems likely to be justified in only one type of real world case. This is the case of a completely fraudulent company that convinced the market that it had a positive value. Its constant true value, however, was zero.

Our taxonomy of curative disclosures is by no means exhaustive. Our aim has been to address the most common types of disclosures and provide a framework for systematically selecting an inflation measure. One can imagine variants and combinations of the four above, as well as disclosures of a completely different nature. The framework discussed above is a guide to both avoiding the use of a clearly incorrect measure and developing an appropriate one.

B. Examples

We can now consider how these disclosure types apply to certain examples. Suppose first that the company in question is a holding company with no liabilities and only one asset, a 50% ownership stake in a second company with actual operations. Now suppose that one day the company announces that it never held a 50% ownership stake in the second company, but instead only held a 45% stake. It should be apparent that in this example the original stock price would have been 10% (the ratio of 5% to 50%) lower had the market known that the holding company only held 45%, instead of 50%, of the operating company. In fact, one would also expect that in an efficient market, if only the future cash flows from the operating company matter, then the stock price reaction to the corrective disclosure would be a 10% decline.[8] This type of reasoning applies generally where the allegation has a multiplicative effect on a component of the net present value calculation, whether it be a percentage change in cash flows (as above), effective tax rates or margins (both affecting cash flows in a

[8] Unfortunately, life is not always so easy. In addition to revaluing the future cash flows, the market would likely consider additional effects such as whether the company is now due a lump-sum tax refund if it overpaid previous taxes as well as additional litigation costs that the holding company many now incur if it is sued for securities fraud. To the extent that these are one-time effects, such as the tax refund, then this would not represent a pure percentage inflation.

multiplicative fashion), or the company's growth rate (which, with a constant discount rate, would have a multiplicative effect on the present value of future cash flows). A number of these cases are illustrated in the mathematical appendix.

As another example, consider a company with various operations that announces that it has received a one-time after-tax million dollar cash payment for some event that will never happen again. This million dollars would then be incorporated into the market's views of the company's current net assets and therefore raise the company's stock price by a million dollars divided by the number of shares outstanding. Continuing our example, if the company had a million shares outstanding the effect would be a dollar per share. Consequently, if the company later announces that it never received the million dollars, or perhaps that the million dollars is uncollectable, then the direct effect on the stock price will be a decline of a dollar per share.[9] The effect of the announcement would be independent of the state of the company and would be best represented by a constant dollar inflation, meaning that the inflation would have been a dollar at earlier points in the class period. This reasoning then applies to any disclosure of a one-time event.

Unfortunately, it is not always clear whether a certain disclosure is better modeled as a constant percentage or constant dollar inflation. For example, consider a conglomerate with ten different factories each producing a different product. Suppose that at some point the conglomerate announces that one of the factories was completely fictitious and never existed. One possibility is that this represents a relatively constant percentage of the company's stock price equal to the percentage of cash flows that were expected from the fictitious factory. This presumption would be supported if most of the movements in the company's stock price were due to events that affected the company across the board, such as changes in tax and interest rates in the economy. Another possibility is that the market viewed the fictitious factory as a single asset in the company's portfolio - in other words, that the value of the company was simply the sum of the values of the different factories, and those values moved independently. This presumption would be supported if most of the movements in the company's stock price

[9] As discussed above, there may be other effects such as tax implications and the costs of expected litigation. To the extent that these are also perceived to be one-time events, then the qualitative discussion in the text above is unchanged.

were tied to favorable or adverse news about particular factories or product lines. In that case, stock price movements due to news about a different factory should not affect the inflation in the stock price, which would then be best represented as a constant dollar inflation, with the dollar amount changing when there was news about the fictitious factory. The distinction between these two paradigms is therefore not as clear as one might hope.

Next, consider an example where the only operating asset is the fictitious factory, and that news releases about the non-existent factory appeared to move the stock price over the course of the class period. It should be clear that the true stock price would be zero, or at best near zero if there was a chance that the factory could be built. In this case, one could model the true value as being a constant, or nearly so, at the value the stock price reached after the corrective disclosure. Note, however, that it is crucial for this scenario that the factory truly be fictitious. If it were a real factory that was producing cash flows, even if those cash flows were overstated, then there is no *ex ante* reason to believe that the value of that factory would have been a constant, or even relatively constant, over the class period.

Finally, it should be reemphasized that all three of the examples discussed above – constant percentage inflation, constant dollar inflation, and constant true value – are simply idealized representations used to model inflation. Many examples of fraud will have some characteristics of one or more type, and one goal should be to see which paradigm is the most reasonable, while recognizing that none will perfectly measure the inflation in the stock price[10]On the other hand, this does not mean that a careful statistical analysis that can provide a better model should be eschewed in favor of a simple paradigm. If an objective analysis can provide a more accurate inflation measurement, then it would make sense to use that inflation measure instead.

III. The Interrelation Between Inflation and Loss Causation

One of the elements in proving damages in a securities fraud case is to show that plaintiffs' losses were caused by the alleged fraud. This analysis is often thought of either as

[10] It is also the case that some patterns of inflation can exhibit inconstancy of the dollar amount or percentage of inflation as in the example given in Judge Sneed's concurring opinion in *Green v. Occidental Petroleum*. However, the framework presented in this paper is useful even in such cases.

separate from the calculation of inflation, or else is considered to be accomplished by calculating damages as the difference between inflation at the time of purchase and at the time of sale (or simply inflation at the time of purchase if a share is held to the end of a class period.) For example, in *Blackie v. Barrack* 524 F.2d 891 (1975) at 906, the court opined that "[m]ateriality circumstantially establishes the reliance of some market traders and hence the inflation in the stock price – when the purchase is made the causal chain between defendant's conduct and plaintiff's loss is sufficiently established to make out a prima facie case," thereby tying the inflation at the time of purchase to the loss causation requirement.

Consider, however, the following example. Suppose that an investor purchases a stock at a price of $20. The stock then falls in value to $10 due to non-fraudulent reasons. There is then a corrective disclosure that lowers the stock price to $9. We then ask what the inflation is and what the investor's allowable damage claim is.

A. Constant Dollar Inflation

Under a constant dollar inflation, there is a $1 per share inflation, measured at the time of the corrective disclosure. This $1 inflation is then the investor's damage claim. This is both the amount that she overpaid upon purchasing the stock and the amount that she actually lost at the time of the corrective disclosure.

B. Constant Percentage Inflation

Suppose instead we used a constant percentage inflation measure. The measured price decline of 10% at the time of the disclosure would then translate into a $2 inflation at the time of purchase. If the investor is allowed to recover the amount she overpaid at the time of purchase, this would be her claim. On the other hand, if her damages are limited to the decline in the value of her investment *due to* the disclosure, then she is only entitled to a claim of $1.[11] In this case, the constant percentage inflation methodology would result in a damage claim that is too large – i.e., it allows the investor to recover losses that were unrelated to the fraud. Note

[11] See, for example, *The Ambassador Hotel Company, Ltd. v. Wei-Chuan Investment*, 189 F.3d 1017, 1999: "In fact, some securities fraud cases do state that if the plaintiff would have lost its investment despite any misrepresentation by the defendant, plaintiff has failed to prove loss causation."

that if the stock price had been low at the beginning of the class period, say $5 per share, then the inflation at the time of purchase would be $0.50, or ten percent of the stock price. This figure would then equal the maximum damage under the out-of-pocket measure. Therefore, if damages are limited to the *minimum* of inflation on purchase and the loss caused by a disclosure, the constant percentage methodology (or, in fact, any methodology other than the constant dollar inflation) will either give the correct damage claim or else overstate the damage claim.

The use of a constant percentage methodology may also lead to concerns about some investors receiving a damage claim even though they did not hold through a disclosure. Consider, for example, an investor who buys a stock at $20 and sells it at $10 in the above example, where the $10 price decline was not due to the fraud or its revelation. If there is a constant 10% price inflation, then the investor overpaid by $2 on purchase but only received back $1 in inflated proceeds. Should this investor therefore have a claim of $1 based on the difference between her purchase and sale inflation? One view is that because the fraud interacted with the stock price, the investor is indeed entitled to claim the $1 in damages. Another view is that because the price decline is independent of the fraud, the investor's loss was not caused by any fraudulent action or disclosure, and therefore she has no damage claim. If proving loss causation means that the latter view is correct, then the straightforward application of a percentage inflation will give many in-and-out traders an improper damage claim. Some experts have attempted to circumvent this problem by only giving a damage claim to in-and-out traders who held past a disclosure. Yet, even this attempted solution creates its own problems. Consider first an investor who bought at $20 and retained her share until the end of the class period. In the example given above, she has a $2 claim. Now consider what her claim would be if at some point when the stock was trading at $10 she sold her share and then bought it back again for $10 a second later. The first share, the in-and-out, would have no claim because it was not held over a disclosure; the second share, the retention share bought at $10, would have a $1 claim. Therefore, adding in an economically meaningless set of transactions, a virtually instantaneous sale and purchase at the same price, significantly changes the damage claim. While one might argue that such a result is legally correct, it is clearly economically nonsensical.

C. Constant True Value

Finally, consider what one would calculate using a constant true value methodology. Since the stock price is $9 after the curative disclosure, this is also the true value at the time of purchase, making the damage claim $11. However, under the assumptions of the hypothetical case that we present, this significantly overestimates the investor's loss due to the fraud. The problem, of course, stems from the failure to determine what portion of the $11 decline from the $20 purchase price to the $9 value at the end of the class period is due to the fraud. A constant true value methodology would only makes sense if there were no material changes in the company's stock price as a result of non-fraudulent factors.[12] Unless a company were a total fraud, having no true component to its value, it is unlikely that all or nearly all of the price movements over a class period could be attributed to fraud.

In fact, many courts have determined that it is necessary to use an event study to distinguish between stock-price movements due to fraud and movements due to other factors.[13] To use the event study methodology, an expert has to first gather news stories related to the company over the class period and to determine which of those stories represent a possible misstatement or curative disclosure. To move from this data collection to an event study, the expert must then perform statistical analyses to determine the effects of that news, generally after controlling for contemporaneous market and/or industry influences.[14,15] The calculations

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[12] A refinement on the constant true value methodology is the index method, in which the true value is determined at the end of the class period and then, rather than taking this value as constant throughout the class period, the value is pegged to a market or industry index which is then backcast to the beginning of the class period. This methodology has the advantage of incorporating market and/or industry influences on the stock. On the other hand, it can greatly inflate in-and-out damages because the stock and index returns are not equal, which leads to a varying inflation over the class period.

[13] See, for example, *In re Seagate Technology II Securities Litigation*, 1994 WL– 41834 (N.D. Cal.), in which the court accepted some of defendants' event studies and dismissed certain claims on that basis, but ruled that defendants' other event studies were inadequate and denied their request for summary judgment with regard to those issues. The court also found plaintiffs' event studies lacking and therefore denied a cross-motion for summary judgment. See also, *In re Executive Telecard , Ltd. Securities Litigation*, 94 Civ. 7846(CLB), (S.D. New York 1997) and see *Goldkrantz v. Griffin*, 97-CV-9075 (U.S.D.C. SDNY), in which the court granted summary judgment based on plaintiffs' failure to contest defendants' event study analysis.

[14] See, for example, *In re Seagate Technology II Securities Litigation*, 1994 WL– 41834 (N.D. Cal.) ("Decoding how much of the price behavior of a security is attributable to alleged market manipulation requires statistical analysis.") Some academic papers that use the event study methodology include:

a. Daniel R. Fischel, "Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities," 38 *Bus. Law.* 1 (1982).

in the event study allow for an objective quantification of the statistical significance (or materiality) of the effects of the news, a feature that distinguishes it from a mere listing of news stories and contemporaneous stock prices that requires subjective interpretation. Because the constant true value methodology does none of the above, it often misestimates the inflation in a stock at the time of purchase. And, like the constant percentage inflation method, if damages are limited to the lower of inflation on purchase and actual loss on disclosure, the constant true value methodology can overstate damages though it would never understate them.

IV. Emprical Analysis of the Use of Different Inflation Measures

A. Case Study: *Cendant Securities Litigation*

It is clear that if there is only one curative disclosure of a misstatement, the methods of calculating share price inflation have very different implications not only for retained shares, but for estimating damages to those who bought and sold shares during the class period, the so called in-and-outs. In the case of constant dollar inflation, in-and-outs would receive no damages as the stock price was inflated by a constant amount during the class period.[16] For constant percentage inflation, unless the expert makes an explicity adjustment, as discussed above, the model will generally award damages to some in-and-out shares since the dollar amount of inflation changes day to day, though the percentage does not. Similarly, a constant

b. Jon Koslow, Note, "Estimating Aggregate Damages in Class Action Litigation Under Rule 10b-5 for Purposes of Settlement," 59 *Fordham L. Rev.* 811, 826-42 (1991).
c. Philip J. Leas, Note, "The Measure of Damages in Rule 10b-5 Cases Involving Actively Traded Securities," 26 *Stan. L. Rev.* 371 385-96 (1974).
d. Jonathan R. Macey, Geoffrey P. Miller, Mark L. Mitchell and Jeffrey M. Netter, "Lessons from Financial Economics: Materiality, Reliance, and Extending the Reach of Basic v. Levinson," 77 *Va. L. Rev*. 1017, 1021-28 (1991).
e. A. Craig MacKinlay, "Event Studies in Economics and Finance," 35 *Journal of Economic Literature* (March 1997), pp. 13-39.
f. Mark L. Mitchell and Jeffrey M. Netter, "The Role of Financial Economics in Securities Fraud Cases: Applications at the Securities and Exchange Committee," 49 *Bus. Law*. (1994), pp. 545-590.
g. David Tabak and Frederick Dunbar, "Materiality and Magnitude: Event Studies in the Courtroom," in *Litigation Services Handbook: The Role of the Financial Expert, Third Edition* (2001).

[15] In cases where there is both fraud-related and non-fraud-related information released at the same time, it is then further necessary to separate out the effects of those two sources of news.

[16] Here we assume that there is only one alleged disclosure at the end of the class period. Obviously if there are partial disclosures, then in-and-out traders can receive a damage claim.

true value methodology will yield damages for some in-and-outs, as the inflation will tend to change daily.

As Judge Walker observed in *Ravens et al v. Iftikar et al.*, (174 F.R.D. 651) "Because actual price behavior is given, the parties can only dispute what the price of the security would have been in the absence of fraud." Given that large differences can result in the estimated damages to retained shares solely as a result of the choice of the inflation model and the fact that the presence or absence of damages to in-and-outs may also hinge on this choice, one would hope that there is a sound basis for which inflation methodology has been used in different cases.

Unsurprisingly, however, the question of the appropriate method to measure stock price inflation has been the basis of some controversy in the case law. For example, in the *Cendant Corporation Securities Litigation* (109 F, Supp.2d 235) Judge Walls approved a settlement based on an increasing constant percentage model of inflation developed by Plaintiffs' expert Frank C. Dorkey. This approach estimated the inflation due to multiple misstatements by assuming that the stock price equaled its true value at the end of the class period but that the inflation percentage had increased over the class period due to the successive misstatements during earnings announcements. Class members Janice and Robert Davidson objected to the plan on a number of grounds, among them that "the fraudulent inflation…increased constantly throughout the Class period. It therefore assumes in and out purchasers and sellers assumed no damages." Lead Plaintiffs countered that the plan "expressly rejects such damages…because…those who purchased then sold Cendant stock while it was still inflated…benefited from the company's ongoing fraud and suffered no damage." Though the plan was approved, we observe that the the model would in fact not rule out damages for in-and-outs, because those who traded between earnings announcements had at least a theoretical case for damages if their purchase inflation exceeded their sale inflation. Interestingly enough, Plaintiffs claimed that Mr. Dorkey's model was based on the model used by David J. Ross and accepted by Judge Walker in the *California Micro Devices Securities Litigation* (965 F. Supp. 1327). Mr. Ross' model however assumed a *constant dollar* amount of inflation that grew with successive misstatements, as opposed to the *constant percentage* inflation used in the Cendant

case. The constant dollar formulation would indeed rule out-in-and out damages prior to a curative disclosure.

B. Data on 2001 Settlements

There appears to be a large distribution of inflation scenarios used in practice. Janet Cooper Alexander has claimed that following an event study to determine the effect of a disclosure, the "simplest (and most common) method [of determining the inflation before the disclosure] is to assume that the value of the information remains constant throughout the class period,"[17] referring to the constant dollar inflation methodology. Professor Alexander then cites as an "alternative method," the assumption that the inflation is a constant percentage of the stock price. Interestingly, Professor Alexander states that the plaintiffs' expert in a case she examines presented the constant dollar inflation as the basis of his calculations, but also "testified that it would have been *equally plausible* to assume that the value of the information was not a constant dollar value of $3.25, but 10% of the stock price."[18] (Emphasis added.) For the constant dollar and constant percentage inflation measures to be considered equally plausible would either have to be an extreme coincidence, or else be an admission of an inability to analyze which inflation methodology is more appropriate. Returning to Professor Alexander's taxonomy, she ends by noting a "third method … [that] would attempt to determine the actual value of the information on each day of the class period. Applying this method would likely require some heroic assumptions …" As discussed above, such methods would indeed either require assumptions that are either unrealistic (e.g., a constant true value, which assumes that there was no major news or market influences throughout the class period) or would require careful analyses in order to quantify effects that change over time.

To test Professor Alexander's assertion that the most common method for estimating inflation throughout a class period is the constant dollar method, we examined all of the settlement plans of allocation reported in *Securities Class Action Alert* in 2001. These settlement plans are, of course, not necessarily the inflation calculations by either plaintiffs' or

[17] Janet Cooper Alexander, "The Value of Bad News in Securities Class Actions," *UCLA Law R.*, August 1994, p. 1433.

[18] Alexander, *op. cit*,. p. 1457.

defendants' experts, but instead reflect some view of the amount that plaintiffs could be expected to recover if they went to trial. For our analysis, we classified the plan of allocation for each category of securities and determined whether the allowable loss was based on a constant dollar amount (where the amount could be variable throughout the class period), a constant percentage, or a constant true value. Plans not classifiable into one of the above methodologies were counted in a residual category for allocations that were either unknown or appeared to follow some other scheme. We also classified the plans by whether the allowable loss was based on a single methodology, or whether there were multiple categories involved (e.g., the allowable loss could be the minimum of a constant dollar inflation and the difference between the purchase price and a constant true value.) We also excluded from our analysis any provisions that limited an allowable claim to a plaintiff's purchase price less sales price, because this is often used as a means of ensuring that no plaintiff recovers more than her actual loss.

It should be noted that there are several issues that make some of the classifications either difficult or somewhat subjective. First, it is not always possible to distinguish a change in a constant percentage inflation from a change in the merits of plaintiffs' claims at different points in time. For example, consider a settlement that provides purchasers during one part of the class period with a claim of 90% of their purchase price and provides purchasers during another portion of the class period with a claim of 75% of their purchase price. It could be the case that there was a constant percentage inflation, equal to 90% of the stock price at one point and 75% of the stock price at another. However, it could also be the case that purchasers during one portion of the class period had a stronger case on liability and therefore merited a settlement that was a larger percentage of their purchase price.

A second issue confounding the classification is the bounce-back provision of the 1995 Private Securities Litigation Reform Act (the "PSLRA"). This provision limited damage claims for investors who held shares for at least ninety days past a disclosure to the difference between their purchase price and the average price over the ninety days following a disclosure. Investors who sold within the ninety days after a disclosure had their damage claim limited to their purchase price less the average price between the disclosure and their sale. If this provision is implemented in a settlement, and if sales within the ninety day post-disclosure

period are not accounted for, then the settlement has a provision that limits damages to purchase price less some other price, or exactly the same calculation as is seen under a constant true value analysis. In fact, some settlements did include this cap and referred to the ninety-day post-class period stock price (though without making the appropriate statutory provisions for plaintiffs who sold within the ninety-day period!) Other settlements did not even mention this cap, which, depending on the stock price over the class period, could have left some investors with an allowable claim larger than the amount permitted under the PSLRA.[19]

A third confounding factor in the classification of settlements is that if there is a constant percentage of inflation over the entire class period, this percentage can become irrelevant in the allocation of a fixed settlement pool. For example, if Plaintiff 1 purchased her shares for $1,000 and Plaintiff 2 purchased her shares for $500, then if the allowable claim is simply a plaintiff's purchase price, Plaintiff 1 has an allowable claim twice that of Plaintiff 2, and would be entitled to two-thirds of the settlement fund if they were the only plaintiffs. Suppose, however, that it was determined that 38% of the stock price was due to inflation over the whole class period. Plaintiff 1 would then have a claim of $380 and Plaintiff 2 would have a claim of $190, again entitling Plaintiff 1 to two-thirds of the settlement fund. In this case, which covers both retention and in-and-out plaintiffs, the inflation percentage becomes irrelevant, and it may not be included in the plan of allocation. However, it then is unclear whether damages are really based on a constant percentage inflation methodology, or instead are simply based on plaintiffs' actual losses without regard to any inflation methodology.

With these caveats in mind, we then turn to the results of our empirical investigation. Within those classes of securities for which only one inflation methodology was used in the settlement, we find that 21, or 18.4%, of cases involved a constant dollar approach. Seven

[19] The conflating of the bounce-back limitation with the actual damage measure may not be limited to practitioners. Philip H. Dybvig, Ning Gong, and Rachel Schwartz in "Bias of Damage Awards and Free Options in Securities Litigation," *Journal of Financial Intermediation*, 2000 note first that the PSLRA caps damages, yet their paper later relies on "basing compensation for damages on the difference between the purchase price and the price on the day the misrepresentation is corrected," and generally ignores any interaction between the bounce-back cap the standard inflation analyses. Perhaps similarly, Edward A. Dyl, "Estimating Economic Damages in Class Action Securties Fraud Litigation," *Journal of Forensic Economics*, 1999, notes that the bounce-back measurement is a cap on allowable claims, but still refers to it as an "approach for estimating damages." Dyl also argues for use of a constant true value methodology, particularly in cases where there is no significant relationship of the company's stock price with a market index following the corrective disclosure(s).

cases, or 6.1%, involved a constant percentage methodology. A hefty 55 cases, or 48.2%, were based on a constant true value, and 31 cases, or 27.2%, were either based on some other methodology or else the methodology used was not described in sufficient detail for classification.

A slightly different pattern is displayed in those cases where a combination of inflation methodologies was used. Here we count how many times each methodology showed up in the plan of allocation for a class of securities. There were 33 usages of the constant dollar method, representing 25.4% of the usages in those settlements with more than one inflation methodology. A constant percentage inflation was employed 36 times, or in 27.7% of all usages. There were 55 usages, or 42.3%, of the constant true value, and 6 usages, or 4.6%, of some other methodology.

V. Discussion of Results

The results presented above indicate that the constant dollar inflation is slightly more popular than the constant inflation methodology. Also, this difference is essentially entirely based on settlements that involve only a single inflation methodology, with the two being used roughly the same number of times in settlements using more than one methodology.

Another result that jumps out of the data is the high usage of settlements based on constant true values, particularly in the case where only one inflation methodology is used. This result is potentially disturbing. As noted above, because a constant true value rule only makes sense if the stock price would have stayed the same throughout the class period, these should be cases where the issuer had absolutely no truthful material announcements that either positively or negatively affected the stock price throughout the entire class period. Given that many of these constant true values were not at trivial stock prices, this says that many settlements are based on the implicit assumption that many companies that had legitimate businesses never suffered any meaningful changes in the true value of their business over periods of months or years, a result that appears highly implausible.

By implicitly assuming that all stock price declines during the class period are due to fraud, these settlements do not appear to be following the general rule of testing for materiality and then accounting for loss causation through an event study or other methodology to separate

out fraudulent from non-fraudulent components of stock price movement. This means that because the allowable claims are not tied to plaintiffs' actual damages, some plaintiffs will get an overly large share of the settlement fund while others will receive an inadequate share. While one cannot insist on exact precision in having plaintiffs' recoveries be proportional to their losses, the use of a constant true value methodology can result in extreme deviations from that goal. For example, suppose one plaintiff purchases a stock at $50 and then the company suffers a legitimate loss that lowers its stock price to $40. A second plaintiff who purchases at the lower price will have a damage claim only $10 less than the first. Therefore, the first plaintiff will be able to claim her entire $10 non-fraud related loss as a damage claim and have a portion of that loss recovered at the expense of other plaintiffs who may have legitimate damage claims.[20] This result suggests that there are many settlements where some plaintiffs with legitimate fraud-related losses, assuming that defendants are indeed liable in the matter, are receiving an inadequate settlement and in fact subsidizing other plaintiffs whose losses are not wholly related to the alleged fraud. Such a result is not wholly unexpected, given that plaintiffs' counsel are generally compensated based on the total recovery of the class, and not whether the recovery is allocated appropriately. However, unless one is willing to assume that these cases represent situations where there was no material non-fraud related announcement affecting a company's stock price during the class period, it does suggest that many recent settlements are not treating all plaintiffs equitably.

VI. Conclusion

This paper presents an analysis of the theoretical justifications for different inflation methodologies. We conclude that the constant dollar and constant percentage inflation methodologies serve as useful idealized paradigms for modeling various types of different allegations. The constant true value methodology is generally too restrictive except when that

[20] Denise N. Martin, Vinita M. Juneja, Todd S. Foster, and Frederick C. Dunbar in "Recent Trends IV: What Explains Filings and Settlements in Shareholder Class Actions?" (November 1996) report that actual settlements only rise between 0.52 and 0.57 log points for each log point increase in plaintiffs' claimed damages, with the difference in measurements being due to use of different control variables in their regression analysis. (See Table 19.) This finding implies that if one plaintiff is able to marginally increase her claim illegitimately, defendants pay for approximately 52 to 57% of her extra recovery while the remainder is borne by other plaintiffs who see their recoveries shrink.

true value is at or near zero. When considering the interaction between inflation and loss causation, there is no difficulty with the constant dollar inflation, while other inflation methodologies may overstate the proper damage claim. In practice, however, the use of a constant true value is highly popular in settlement plans of allocation, including cases where that value is not close to zero. After that, the constant dollar inflation appears somewhat more popular than the constant percentage inflation. Whether these usages are indeed justified in the individual cases in which they were applied is a question we do not address; however, given the general lack of previous discussion about the proper inflation methodology and the interaction between inflation and loss causation, one must at least question whether all plaintiffs have been treated equitably in these settlements.

Appendix 1

This appendix shows the pre-disclosure (P_1) and post-disclosure (P_2) valuations of a theoretical company. The constant percentage (P_1/P_2-1) and constant dollar (P_1-P_2) inflations are then calculated. (The constant percentage inflation is shown as simply the ratio of prices, P_1/P_2, for ease of presentation.)

1) Disclosure: Earnings will experience a one-time decrease of k at the end of the next period:

$$P_1 = X/r \;;\; P_2 = X/r - k/(1+r)$$

$$\Rightarrow \frac{P_1}{P_2} = \frac{X}{X - \frac{rk}{1+r}} \;;\; \boxed{P_1 - P_2 = -k/(1+r)}$$

2) Disclosure: Earnings will experience a shortfall of k in every period beginning the end of next period:

$$P_1 = X/r \;;\; P_2 = \frac{X-k}{r}$$

$$\Rightarrow \frac{P_1}{P_2} = \frac{X}{X-k} \;;\; \boxed{P_1 - P_2 = -k/r}$$

3) Disclosure: Earnings will grow at a rate of $g_2 = ag_1$ instead of g_1 ($a<1$), from a base of X, after next period:

$$P_1 = X/(r-g_1) \;;\; P_2 = X/(r-g_2)$$

$$\Rightarrow \boxed{\frac{P_1}{P_2} = \frac{r-g_2}{r-g_2/a}} \;;\; P_1 - P_2 = X\left(\frac{1}{r-g_2/a} - \frac{1}{r-g_2}\right)$$

4) Disclosure: Instead of X in every period hereafter, earnings will be aX ($a<1$):

$$P_1 = X/r \;;\; P_2 = aX/r$$

$$\Rightarrow \boxed{\frac{P_1}{P_2} = \frac{1}{a}} \;;\; P_1 - P_2 = X/r(1-a)$$

Appendix 2

This appendix shows why the constant percentage inflation method is generally not appropriate for companies with positive amounts of debt.

Consider a company with a present discounted value of future cash flows equal to $300. Suppose further that the company has $100 in debt. Its equity would then be worth $200. Finally, assume that, unknown to the market, 50% of the company's assets (and their expected cash flows) simply do not exist. The market should then value the company at $150, with $100 going to debt and $50 to equity. The inflation in the stock, $150, equals 75% of the $200 stock price.

Now suppose that the company is legitimately able to double its profit margin on all operations. The market then believes that the present value of future cash flows is now $600, and allocates $100 to debt and $500 to equity. However, in truth, the company is only worth $300, of which $100 should be allocated to debt and $200 to equity. Thus, $300 of the $500 that the market believes the equity to be worth is actually fraudulent. Therefore 60% of the stock price is attributable to the fraud.

This example is also illustrated in the table below.

	Case 1			Case 2	
	Market View	Truth		Market View	Truth
Debt	100	100		100	100
Equity	200	50		500	200
Total Enterprise Value	300	150		600	300
Inflation = 150/200 = 75%				Inflation = 300/500 = 60%	